

REMARKS

Claims 1-9 and 20-24 are pending in the application. Claims 1, 8 and 9 are herein amended. No new matter has been added.

Support for newly amended claims 1, 8 and 9 may be found in the as-originally filed specification, for example see Example 1, paragraph [0049] of the present specification.

Rejections under 35 U.S.C. §103(a)

Claims 1-9 and 20-24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Domoto et al. (JR 09-207289) (hereinafter Domoto) in view of Enomoto et al. (JP 2002-096434) (hereinafter Enomoto). Applicants respectfully traverse this rejection.

Domoto discloses the fluorocarbon resin layer may be PTFE, FEP, PFA, PCTFE, PVDF, PVF, PETFE, etc. Domoto, paragraph [0013]. Thus, Domoto discloses at least 7 different fluorocarbon resins which may be used in the resulting film. Of the 7 different fluorocarbon resins disclosed, only PTFE was illustrated in the disclosed drawings and examples. See Domoto, Figure 1, paragraphs [0020]-[0029]. Furthermore, Domoto does not disclose a fluorocarbon resin layer comprising a combination of the 2 or more different fluorocarbon resins in a sheet, which is a feature of the presently claimed invention.

The disclosure of Domoto discloses PTFE in each of the layers of the film, whereas the presently claimed photocatalyst sheet may contain a different fluorocarbon resin layer in each of the three layers. Moreover, the second and third fluorocarbon layers must contain FEP or PFA and FEP, respectively. The recited fluorocarbon resins coated in a specific order to achieve the presently claimed photocatalyst sheet are not rendered obvious by Domoto. Domoto does not

provide any reason or motivation for a skilled artisan to achieve the presently claimed photocatalyst sheet in the recited manner. There is no reason or motivation for a skilled artisan to achieve a second and third fluorocarbon layers comprising FEP or PFA and FEP, respectively.

Moreover, the disclosure of Domoto is too attenuated to render obvious the three fluorocarbon resin layers of the presently claimed photocatalyst sheet. See MPEP §2131.02. Domoto discloses too many different possible fluorocarbon resin layers to render each of the fluorocarbon resin layers in the recited order in the presently claimed photocatalyst sheet obvious.

Furthermore, the fluorocarbon resin layers of the presently claimed photocatalyst sheet are too attenuated from the disclosure of Domoto, due to the various possible combination of fluorocarbon resin layers. Domoto discloses at least 7 different fluorocarbon resins. Thus, Domoto discloses an exponential number of possible fluorocarbon resin layer combinations. The possibility of a skilled artisan achieving the presently claimed photocatalyst sheet is not sufficiently disclosed and thus, is not well delineated in Domoto. Therefore, a skilled artisan would have no reason or motivation to obtain the presently claimed photocatalyst sheet, including a third layer containing FEP and photocatalyst titanium oxide, based on the numerous possibilities disclosure in Domoto.

Domoto teaches away from at least the presently claimed photocatalyst sheet comprising three layers of fluorocarbon resin, wherein the first layer contains PTFE, the second layer contains FEP or PFA and the third layer contains FEP and a photocatalyst. Domoto teaches away from the three layers of fluorocarbon resin features of the presently claimed photocatalyst

sheet by disclosing examples and drawings wherein each layer containing only PTFE. See Domoto, Figure 1, paragraphs [0020]-[0029]. Domoto does disclose a comparative example wherein the outer layer, PTFE containing photocatalyst titanium oxide, is replaced with a FEP layer. See Domoto, Comparative Example 1, paragraph [0030]. However, Domoto discloses that Comparative Example 1 possesses inferior properties. See Domoto, Table 1. Thus, Domoto discourages or teaches away from using FEP as the outer layer fluorocarbon resin layer. This disclosure by Domoto discourages or teaches away from the third fluorocarbon resin layer feature of the presently claimed invention.

Domoto discloses that the uppermost layer 5 is provided with a layer containing PTFE and photocatalyst powder. However, in order for said sheet to be thermally welded, since, unlike other fluorocarbon resins, melt viscosity is quite high, and photocatalysts are contained, weld intensity for practical use could not be attained unless heated for unrealistically long time.

A novel and unobvious feature of the presently claimed photocatalyst sheet is the third fluorocarbon resin layer consisting of copolymer FEP containing photocatalysts at least titanium oxide coated on said second fluorocarbon layer. A reason for choosing an FEP layer as the outermost layer, i.e., the third layer, is that the melt viscosity of PTFE is 10^{10} - 10^{12} Pa•s, whereas that of other fluorocarbon resins it is 10^4 - 10^6 Pa•s.

Therefore, if the photocatalyst sheets of Domoto is thermally welded to each other by the same welding condition, as in the presently claimed invention, for complete weldability, and the welded part is peeled off at the rate of 20 mm/min, then the whole fluorocarbon resin layer of Domoto, made of PTFE, is not completely peeled off from a substrate. That is, the weldability

of Domoto is unsatisfactory, and cannot achieve at least this feature of the presently claimed invention. This may be due to incomplete welding of the fluorocarbon resin layer made of PTFE. As discussed above, complete weldability cannot be achieved in Domoto. Thus, complete peeling off from a substrate may be an unexpected result of the presently claimed invention over Domoto.

Furthermore, when the Domoto photocatalyst sheet is used as a film/fabric structure material there is a problem in that the required intensity cannot be attained. Hence, a skilled artisan would not consider it obvious or practically to use as a film/fabric structure material the photocatalyst sheet of Domoto.

On the other hand, a photocatalyst sheet of the presently claimed invention may possess good thermal weldability when thermally welded to each other by the same welding condition, as discussed above. Furthermore, when the welded part is peeled off at the rate of 20 mm/min, then the whole fluorocarbon resin layer is completely peeled off from a substrate. That is, the presently claimed invention may achieve completely welded fluorocarbon resin layers with good welding intensity, which may then be used for a structure material.

Enomoto discloses a toxic gas treatment sheet. The toxic gas treatment sheet of Enomoto comprises a first layer 5; and a second layer 6. See Enomoto, Figure 1. Enomoto discloses that the first layer 5 contains a PTFE 3 containing the photocatalyst particles (TiO_2) as a bonding material and the second layer 6 contains a PTFE 3 containing ceramic particles (SiC) 2 as a bonding material. Further, the second layer 6 contains an FEP 4 having a melting point lower

than that of the PTFE 3. Based on this disclosure, the toxic gas treatment sheet of Enomoto is a two layered structure.

Enomoto does not disclose, teach, suggest or provide any reason for achieving a FEP layer disposed on a PTFE layer. Enomoto merely discloses FEP mixed with PTFE layer 6. See Enomoto, paragraphs [0026], [0027], [0030] to [0033], and Figure 1.

Furthermore, the structure of Enomoto, that of mixing FEP in PTFE layer 6, is not chemically stable. Thus, a skilled artisan at the time of invention would have no reason or motivation for forming such a structure. A chemically unstable structure is not an obvious or preferable material for a film /fabric structure, whereas the presently claimed photocatalyst may be used.

Hence, a skilled artisan would not consider it obvious to use the toxic gas treatment sheet of Enomoto in thermal welding, such a for making as film/fabric structure.

In the outstanding Office Action, the Examiner asserts that Domoto in view of Enomoto discloses the same film structural material as recited in presently claimed photocatalyst, and thus, the physical properties of the presently claimed photocatalyst sheet, i.e., water repellent, peel-off rate and thermal weldability, would necessarily follow. See Office Action, pages 5 and 6. Applicants respectfully disagree.

Domoto in view of Enomoto does not disclose, teach, suggest or provide any reason for achieving the film structural material recited in present claims. Moreover, the combination of the cited art fails to render obvious each of the three fluorocarbon resin layers, comprising specific fluorocarbon resins, coated in the recited order in the presently claimed photocatalyst

sheet. A feature of the presently claimed photocatalyst sheet is the third fluorocarbon resin layer containing FEP and photocatalyst. Applicants respectfully hold that there is no reasonable or logical basis for asserting that the combination of the cited art would inherently possess the physical properties of the presently claimed photocatalyst sheet.

Applicants respectfully hold that Domoto in view of Enomoto does not disclose, teach, suggest or provide any reason for achieving each of the features of the presently claimed photocatalyst sheet. As discussed above, Enomoto discloses a two layer toxic gas treatment sheet. The first layer of Enomoto comprises PTFE and titanium oxide. The second layer of Enomoto comprises PTFE, FEP and ceramic particles. See Enomoto, Figure 1, paragraphs [0026]-[0027]. Thus, even if one of ordinary skill in the art were to combine the disclosure of Enomoto with Domoto, one may not achieve the presently claimed photocatalyst sheet. That is, Enomoto does not disclose exposing photocatalyst on FEP. Also, Domoto does not disclose, teach, suggest or provide any reason for exposing photocatalyst on a FEP layer. Therefore, a skilled artisan at the time of invention would have no reason or motivation for achieving at least this feature of the presently claimed photocatalyst sheet.

Furthermore, Enomoto does not disclose, teach, suggest or provide any reason for achieving a layer comprising FEP and titanium oxide. Enomoto discloses that “without being covered by the fused resin, the surface of the TiO_2 particles in the first layer (PTFE) contacts harmful gas effectively, and contributes to oxidation reason. In the second layer, fused FEP binds to other materials uniformly, and it contributes to improvement in a mechanical strength.”

See Enomoto, paragraph [0028]. Thus, Enomoto does not provide any reason or motivation for a skilled artisan to achieve a layer comprising FEP and titanium oxide.

Enomoto discloses “in the first layer or second layer, PTFE consist of a PTFE particle, and a fibrous thing, became entangled with the TiO_2 particles or the silicon carbide particles, and has joined together. FEP is fused within the second layer, becomes entangled with silicon carbide particles and PTFE and joins together, the mechanical strength of the second layer is raised and the second layer plays the role of the supporting substrate of the first layer.” See Enomoto, paragraph [0027]. Thus, the disclosure of Enomoto illustrates that the improved mechanical strength of the sheet of Enomoto is attributed to the fusing of the PTFE, FEP and the silicon carbide. Thus, there is no motivation or reason for a skilled artisan to combine the disclosure of Enomoto with Domoto, as proposed in the outstanding Office Action. Moreover, there is no reason or motivation for a skilled artisan to achieve the presently claimed photocatalyst sheet from the combined reading of Domoto in view of Enomoto.

For at least the reasons presented, the combined reading of Domoto in view of Enomoto fails to render the presently claimed invention obvious. Favorable reconsideration is earnestly solicited.

In view of the above, Applicants respectfully submit that their claimed invention is allowable and ask that the rejection under 35 U.S.C. §103 be reconsidered and withdrawn. Applicants respectfully submit that this case is in condition for allowance and allowance is respectfully solicited.

Application No.: 10/565,121
Art Unit: 1793

Amendment
Attorney Docket No.: 062015

If any points remain at issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the local exchange number listed below.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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